NEW YORK STATE DEPARTMENT OF TRANSPORTATION
OFFICE OF ENGINEERING
TECHNICAL SERVICES DIVISION

OPERATIONAL PLAN

SFY 1993-94 and Beyond

A NEW NEW YORK

Paul J. Mack, Deputy Chief Engineer
Director, Technical Services Division

TECHNICAL SERVICES DIVISION

MISSION: To provide materials and geotechnical engineering and services and targeted engineering research in a timely and cost effective manner for the Department and other governmental agencies.

This is accomplished through:

- Development and recommendation of engineering policies, standards and specifications.
- Management of a quality assurance program for materials incorporated into Department projects.
- Conduct of specialized engineering studies requiring investigations, testing, analysis and recommendations.

The values we prize:

PEOPLE
TEAMWORK
EXCELLENCE
SERVICE
INTEGRITY

TECHNICAL SERVICES DIVISION
OPERATIONAL PLAN FOR SFY 1993-94 AND BEYOND

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TECHNICAL SERVICES DIVISION
OPERATIONAL PLAN FOR SFY 1993-94 AND BEYOND

I. PLAN OF ACTION

Introduction

The Operational Plan for Technical Services contains and describes the priorities, issues and goals for the program area for SFY 1993-94 and beyond. It is the result of an Operational Planning Process spanning several weeks and culminating in a Division-wide meeting with attendance by four representatives from Regional Technical Services units.

The Technical Services program provides materials and geotechnical engineering services and targeted engineering research to the Department through the:

- development and recommendation of engineering policies, standards and specifications.
- management of a materials quality assurance program.
- conduct of specialized engineering studies requiring investigations, testing and analysis.

These services are provided through the Materials, Soil Mechanics, and Engineering Research and Development Bureaus in the Main Office in conjunction with the Technical Services, Materials and Soils units in the Regions. The Technical Services program is founded on a multi-million dollar investment in laboratories and equipment in both the Main Office and the Regions and a dedicated, capable staff. There are approximately 272 employees in the Division and almost 300 in the Regional counterparts. In the Regions, the program receives its staffing through the Design and Construction program budgets.

The program serves all elements of the Department as well as some external clients because of the program units' expertise and facilities. The majority of services now provided directly support the capital program and this, along with research, are the most significant parts of the mission. The Department's expanded capital program over the next few years will present additional challenges as the workload strains the Division's ability to deliver technical services. Capital program support will remain the Division's first priority and programmed or requested staff enhancements are expected to facilitate this.

A. Strategic Outlook and Plan for the Technical Services Division

The future success of all state transportation departments will be heavily dependant on the ability to foresee and prepare for issues of strategic importance.

On a national scale, the transportation community has completed the Strategic Highway Research Program (SHRP), which concentrated on a short list of high payoff activities, where even modest progress will yield savings many times in excess of the research costs. State DOT's must now struggle with the implementation of the developing solutions in order to gain the promised savings. As a compliment to SHRP and to provide for continuous innovation in the industry, national evaluation centers are under development to evaluate and test new products and to encourage continuous innovative research.

Within New York State, funding has become available to support contract research which could be used to study issues of strategic importance to NYSDOT. It is vital that we put into place a mechanism to ensure the timely, targeted and wise expenditure of this available funding.

Within the Division, there is a growing concern about the effects of corrosion on steel products located in the subterranean region of the highway environment and the resulting performance and fiscal implications of the unknown deterioration.

The Division recognizes the need to support the Department's response to federally mandated use of Crumb Rubber Modified Hot Mix Asphalts. Also recognized is the need to provide continuous support for the developing changes in the methods used to prepare bridges for painting and to progress our long term commitment to define and implement an appropriate division of responsibility for QC/QA as they apply to the production and acceptance of PCC and ACC plant manufactured materials.

The Legislature has recently approved a four-year program of capital highway improvements that will increase each year from $1.3 billion in SFY 93/94 to $1.55 billion in SFY 96/97. The Division will need increased resources, both in personal and non-personal services to provide adequate technical support to the design and construction divisions responsible for capital program delivery.

Finally, the Department has identified the quality assurance of its core activities as an issue of continuing strategic importance.

B. Central Office Plan for SFY 1993-94

As is clear from its name, this Division provides technical services in support of the engineering and operating divisions of the Department. Most of the Division resources are directly involved, on a daily basis, as part of the capital program delivery system during both design and construction phases. This service mission, complimented by a strategic, targeted research program, must and will remain our first priority.

Activities associated with the following issues are all high priorities for the Division and its Bureaus.

Strategic Highway Research Program

The Strategic Highway Research Program (SHRP) was established by Congress in 1987 as a five-year, $150 million research program to improve the performance and durability of our nation's roads and to make those roads safer for both motorists and highway workers. SHRP's contracts concluded in March of 1993. One hundred and thirty products, including new specifications, tests, equipment and reports, are emerging as a result of SHRP's research contracts. It is appropriate and imperative that the Department systematically evaluate all the SHRP products and ultimately implement those of value to our programs.

The Division will establish the implementation of SHRP program products as one of its operational goals in SFY 93/94.

Contract Research

With the passage of ISTEA, significant additional federal funding was provided to the states to provide for both planning and research efforts. Department management earmarked $500,000 annually to provide for targeted contract research for which we do not have sufficient in-house resources or expertise and/or research of strategic importance as defined by Department executive management.

A methodology to provide for executive management direction in the selection of research to be funded has been developed. This implementation of the methodology must be given high priority by the Division and its counterparts in SFY 93/94.

Corrosion

Geotechnical engineering techniques currently being applied to solve foundation and stability problems frequently involve use of steel elements installed in the soil environment. In 1992 alone, NYSDOT installed 200,000 LF of steel piles for structure foundations. Currently, in New York, there are about 200 mechanically stabilized earth structures reinforced with steel strips or wire mesh that are performing as retaining walls, bridge abutments and wingwalls. Added to these are steel elements used as sheet piles, soil nails, rock bolts, tiebacks and permanent anchors at uncounted locations across the state's highway system. At present, we have little information on either the present condition of these elements or their remaining useful life.

In a related matter concerning corrosion of in-place steel pipe drainage systems, questions have been raised which cast some doubt on the design methods presently in use.

The Division considers corrosion as an issue of strategic importance to the preservation and integrity of New York's highway system. IN SFY 93-94 we must begin a program to increase our understanding of breadth and depth of the problem so we may be in a position to advise the Department on its resolution.

The Division will undertake several efforts associated with this issue in SFY 93/94.

First, a proposal for strategic research into the problem of steel corrosion in the soil environment will be prepared by the Soil Mechanics Bureau to be considered for adoption as part of the Engineering Research and Development Bureau program.

Second, an interim review of the current design procedure used to predict and account for corrosion rates of steel drainage pipe is underway. When completed, appropriate recommendations will be made to the Facilities Design Division. In addition to reviewing steel culvert design, the inspection process will be assessed to improve the capability of predicting remaining service life.

An operational goal to increase our understanding of steel culvert corrosion will be undertaken by the Soil Mechanics Bureau.

Crumb Rubber Modified Hot Mix Asphalt

Included in the 1991 ISTEA legislation is a requirement that states provide for the disposal of rubber tires in asphaltic concrete paving materials. The minimum utilization requirement for asphalt pavement containing recycled rubber as a percentage of total tons financed in part with federal aid begins with a minimum of 5% in 1994 and increases to 20% in 1997 and thereafter.

The Division has prepared a variety of specifications which provide for the use of both the "wet" and "dry" process and field testing will be undertaken during the 1993 construction season.

The Division is working jointly with the Facilities Design Division and the Construction Division to draft a proposal for consideration by executive management in implementing the ISTEA requirement. During SFY 93/94, the Division will continue to explore the issue and advise the Department of various strategies for compliance. This will be a high priority issue undertaken by the Materials Bureau.

Bridge Painting

During 1992, a growing awareness, both within and outside NYSDOT, of the health and environmental hazards associated with bridge paint removal took place. The result was a common recognition that a revolutionary change in paint removal methods was required. Working in conjunction with regulatory agencies and other NYSDOT Divisions, the Materials Bureau developed a new containment specification for paint removal that is considered to be compatible with both health and environmental requirements.

In SFY 93/94 the Division will have to provide continuing support in the development of policy and implementation guidance documents. It may also need to assist in necessary Department planning to support specification implementation. It will certainly need to participate in compliance monitoring of active projects to validate the effectiveness of the new removal methods. This will be a high priority issue handled by the Materials Bureau.

Asphalt Concrete QC/QA

The Department made a commitment in 1991 to change quality management for asphalt and portland cement concrete from a "methods approach" to a "QC/QA approach". Under the new system, contractors and suppliers will be made responsible for designing, testing and controlling materials quality and the Department will monitor these activities for assurance purposes.

This effort was established as a multi-year goal which began in June, 1992 and is expected to be completed in December, 1995. Significant progress was made in SFY 92/93. As planned, the asphalt component is approximately one year ahead of the concrete component. The first two pilot contracts containing the asphalt specifications have been let and preconstruction meetings have been or are scheduled. The concrete specifications/procedures are in the process of internal review but have also been discussed with industry representatives.

The goal is on schedule and expected to be completed within the planned time frame.

Division Resources (Personal and Non-Personal)

As noted earlier, each of the next four years are expected to include increases in the DOT capital construction program. Since the Division is part of that program's delivery process, our resources will have to increase to support the needed effort. Proposed increases will be reflected in the final version of this plan as part of the budget component. (Appendix 3).

Programmatic Quality Assurance (Pavement Selection Process)

Over the next five years, it is anticipated NYSDOT will spend more than $3.8 billion on capital projects primarily intended to improve pavement conditions.

Engineering Instruction 92-015 established the policy and procedure for the "Project Level Pavement Selection Process". Essentially the instruction requires a Pavement Evaluation, the product of which is an array of treatments considered appropriate given the condition of the existing pavement. That process is followed by a Life Cycle Cost Analysis of the competing treatment strategies.

The implementation of the policy was staged. However, all projects with an Initial Project Proposal (IPP) approved after January 1, 1993, which include pavement rehabilitation/reconstruction on rural arterials and on urban principal arterials, regardless of access control, will be covered by the policy provided they include one mile of paving work.

Given that treatment decisions supported by annual expenditures averaging $760 million will be governed by the policy, it is appropriate that the Department have a quality assurance system in place to ensure consistent policy application throughout the state.

The Division will propose an operational goal to develop such a system.

Programmatic Quality Assurance (Laboratory Performance Measures)

It is important that performance measurements be instituted on core activities of the Division. An Office of State Comptroller Audit 92-S-58, recommended that the Materials Bureau develop performance measures to effectively manage its laboratories. The Materials Bureau will identify and establish performance measures for use in managing the Chemical Laboratory and the Physical Laboratory. The measures will track testing and other laboratory activities against their cost. Costs for selected tests will be periodically compared to commercial laboratories having the same qualifications (AASHTO Accreditation).

This effort will be handled as a high priority issue by the Materials Bureau.

Programmatic Quality Assurance (Regional Materials Laboratories)

Each region has a laboratory and staff, except Region 11 which relies on a commercial laboratory, to test materials primarily associated with asphalt concrete and portland cement concrete. The purpose of the regional laboratory is to provide a faster turn-around time for tests results than that provided by the central office laboratory. The quality level is ensured by independent programs that evaluate staff proficiency, procedures and equipment. These programs provide independent verification and establishes credibility with the contracting community.

Each region laboratory should have adequate facilities and resources to complete expected tasks at the desired quality level.

The Division will propose an operational goal to develop such a system.

II. GOALS

A. Past Goals

The Division had four operational goals in its 1992-93 Operational Plan. Those goals and their status are outlined below.

1. Asphalt & Concrete QC/QA - The Department has made a commitment to change quality management for asphalt concrete and portland cement concrete from a "methods approach" to a "QC/QA approach". Under this new system, contractors and suppliers will be made responsible for testing and controlling materials quality and the Department will monitor these activities for assurance purposes. This major effort will take place over a five year time span.

   Status: On schedule, the first years activities have progressed as planned. As scheduled hot mix asphalt pilot projects will be placed this construction season.

2. Drilling Service Alternatives - The Department has a fixed in-house drilling capacity that has traditionally been supplemented with drilling contracts when workload exceeds available resources. Due to the size and nature of the coming workload and the potential problems with aging equipment and insufficient staff, it is desirable to identify all options for providing drilling support for the capital program. Under this goal, the procedures of other agencies will be studied and other various contractual arrangements for these types of services will be evaluated. Action alternatives and recommendations will be developed.

   Status: Complete. A report covering alternative actions using drilling contracts has been written and will be used as necessary to meet workload demands.

3. Contract Research Program - As part of the enhanced HPR funding opportunities in ISTEA, is has been proposed to establish a contract research program. Under this proposal, contract researchers will work on specific projects under Department direction. Various assignments are possible, including the RFP process aimed at all research providers or through arrangements with universities. Under this goal, the planning, design and administration processes for this new program would be developed.

   Status: Complete. Procedures have been developed for Contract Research, and a report written to document them. The procedures are being implemented.

4. Region Performance Indicators - As part of the evolving quality assurance role of the Main Office, work done under this goal will start to establish formal performance measures for the Region Technical Services groups. With the coming demands of the increased capital program, it will become even more important to measure the effects of adjustments and enhancements in the program areas in order to fine-tune actions and allocation of resources.

Status: Complete. Performance measures have been developed for the Regional Materials and Soils programs. Regional laboratory testing standards and customer services will be measured and used by the Regional Soils and Materials Engineers. The performance measures will be implemented through the Division.

B. **93-94 Goals**

Four new operational goals have been identified, adding these to a long term goal which continues until 1995, making a total of five operational goals.

They are listed below by name with details in Appendix 1.

1. Asphalt and Concrete QC/QA (long term goal)

2. Programmatic Quality Assurance - Regional Materials Laboratories

3. Programmatic Quality Assurance - Pavement Rehabilitation Treatment Selection Process

4. Corrosion of Steel Culverts

5. Implementation of Strategic Highway Research Program Products

APPENDIX 1 - IMPROVEMENT GOALS

1. Asphalt and Concrete QC/QA

2. Programmatic Quality Assurance -
   Regional Materials Laboratories

3. Programmatic Quality Assurance -
   Pavement Rehabilitation Treatment Selection Process

4. Corrosion of Steel Culverts

5. Implementation of Strategic Highway Research Program Products

Technical Services Division
GOAL STATEMENT

Goal Name: #93-1: Asphalt and Concrete QC/QA

As Is: The Department's quality assurance procedures require full time resident plant inspection, sampling and testing during the production of hot mix asphalt (HMA) and portland cement concrete (PCC). These procedures provide data for the control of the production operation as well as the basis for material acceptance.

Desired State: The contractor performs quality control (QC) sampling, testing and inspection while the Department performs quality assurance (QA) sampling, testing and inspection.

Specific Goal for SFY 93-94:

Continue to work on the asphalt and concrete QC/QA three year goal started in SFY 92-93. This goal is for the development and implementation of a contractor QC and Department QA acceptance system for HMA and PCC by the 1995 construction season.

Team Leader: Thomas Wohlscheid

Team: David Bernard, Paul Ducharme, Fred Szczepanek (Materials Bureau), Jack Sprague (Region 2) and Les Ackerman (Region 8)

Rationale: The Department made a commitment in 1991 to change the quality assurance program for HMA and PCC from a "methods approach" to a "QC/QA" approach. The reasons for the change are to (1) improve or maintain product quality, (2) establish clear lines of responsibility between the contractor and the Department for product quality, and (3) seek operating cost reductions.

Under the new system, the contractors and suppliers will be responsible for selecting the mix design, sample, test, and controlling the quality of the mixture through placement (QC). The Department will monitor these activities and perform sampling and testing for acceptance (QA). Payment will be based upon the percentage of material which is within the specification limits. This percentage will be determined statistically and will take into account both the median value of the tested samples and the variation around that median. Constituent materials will be Department approved as in the past.

Technical Services Division
GOAL STATEMENT

Goal Name: #93-2: Programmatic Quality Assurance - Regional Materials Laboratories

As Is: Each region has a laboratory and staff, except Region 11 which relies on a commercial laboratory, to test materials primarily associated with asphalt concrete and portland cement concrete. The purpose of the regional laboratory is to provide a faster turn-around time for tests results than that provided by the central office laboratory. The quality level is ensured by independent programs that evaluate staff proficiency, procedures and equipment. These programs provide independent verification and establishes credibility with the contracting community.

Desired State: Each region laboratory should have adequate facilities and resources to complete expected tasks at the desired quality level.

Specific Goal for SFY 93-94:

Develop a process to evaluate each regional laboratory for resource needs to provide (1) the level of testing against the minimum required program, and (2) the accuracy of test results. Prepare a needs assessment by March 30, 1994.

Team Leader: Wayne Brule

Team: (To be Arranged)
Central Office - Materials Bureau
Regional Offices - Materials Unit

Rationale: Over the next 5 years, it is anticipated that the Department will spend more than $3.8 billion on capital projects primarily to improve pavements and bridges. Many of the tests required to assure an acceptable quality of the asphalt concrete and portland cement concrete used in these projects will be the responsibility of the Regional Materials Units. Given the magnitude of the expenditures in the capital projects, it is necessary that the Department have a process to assure that level and accuracy of testing in the Regional Laboratories are adequate.

Technical Services Division
GOAL STATEMENT

Goal Name: #93-3: Programmatic Quality Assurance - Pavement Rehabilitation Treatment Selection Process

As Is: Regional staff perform project level pavement evaluations and rehabilitation treatment selections in accordance with Engineering Instruction 92-015 and the "Pavement Rehabilitation Manual: Volumes 1 & 2".

Desired State: Regional staff perform high quality project level pavement evaluations and rehabilitation treatment selections in accordance with Engineering Instruction 92-015 and the "Pavement Rehabilitation Manual: Volumes 1 & 2" that are uniform and consistent with policy throughout the State.

Specific Goal for SFY 93-94:

Establish a system and procedures for use by the Regional Offices and Central Office to measure the quality and uniformity of project level pavement evaluations and pavement rehabilitation treatment selections. Develop the system and test and evaluate it by December 31, 1993. Prepare procedures to implement the quality assurance system by March 30, 1994.

Team Leader: William Snyder, Materials Bureau

Team:

Central Office:
- Mike Brinkman, Materials Bureau
- Carol Hennessy, Design Quality Assurance Bureau

Regional Offices:
- Pete Melas, Region 1, Materials
- Andy Williams, Region 6, Planning
- Tim Giblin, Region 9, Design
- Chris Badour, Region 10, Technical Services

Rationale: Over the next 5 years, it is anticipated that the Department will spend more than $ 3.8 billion on capital projects primarily to improve pavement conditions. Engineering Instruction 92-015 established the policy and procedure for the "Project Level Pavement Selection Process". Essentially the instruction requires a pavement evaluation, the product of that is an array of treatments considered appropriate given the condition of the existing pavement, followed by a life cycle cost analysis of the alternatives to select the recommended treatment.

The implementation of the policy was staged and applies to all specified projects with an initial project proposal (IPP) approved after January 1, 1993. The policy covers projects on rural arterials and on urban principal arterials, regardless of access control, provided that they include one mile of paving work. Given the magnitude of the expenditures in the rehabilitation or reconstruction on capital projects, it is appropriate that the Department have a quality assurance system in place to ensure consistent policy application throughout the state.

Technical Services Division
GOAL STATEMENT

Goal Name: #93-4: Corrosion of Steel Culverts

As Is: The premature failure of the Route 481 steel culvert has focused attention on the issue of corrosion in the soil environment. There are many facets to be considered and evaluated such as past research, design procedures, inspection procedures, instrumentation capabilities, and laboratory testing procedures. Also, it is realized that various NYSDOT organizational units presently have limited responsibility for steel culvert concerns; no unit synthesizes and evaluates the entire subject.

Desired State: NYSDOT should have the ability to accurately predict the remaining service life of each steel culvert in the inventory.

Team Leader: Steve Heiser

Team: Ed Lucas, Materials Bureau, representatives from Highway Maintenance and Structures Divisions

Specific Goal For SFY 93-94:

Starting with the Route 481 forensic investigation, evaluate the existing design, inventory and inspection processes to assess the potential of improving the capability to predict remaining service life of existing steel culverts.

Rationale: The evidence uncovered from the initial studies of the Route 481 culvert failure near Syracuse indicates that our present inspection procedures and evaluation efforts do not always identify the state of corrosion and, therefore, the safe remaining life of steel culverts.

The safety of the traveling public as well as the functionality of the culverts demands that the Department have quality processes in place for decision making.

Technical Services Division
GOAL STATEMENT

Goal Name: #93-5: Implementation of Strategic Highway Research Program Products

As Is: Approximately 15 products developed under the Strategic Highway Research Program (SHRP) are available for implementation. Eight have been implemented by the Department. End user organizations have also made informed decisions to implement eight other SHRP products as soon as they are available. The remaining implementable or soon to be implementable products need to be evaluated and considered for use.

Desired State: End user organizations should be identified for each SHRP product at the time the product is available for delivery. Within six months of availability, each SHRP product should be under evaluation by the end user organization.

Team Leader: R. A. Valenti, Engineering Research and Development Bureau

Team: M. Elkordy, Engineering Research and Development Bureau
T. Vennard, Highway Maintenance Division

Specific Goal for SFY 93-94:

Establish the SHRP Implementation Committee who will be responsible for directing the Department's evaluation of SHRP products. The Committee must identify the products as they become available, introduce them to potential user organizations, and establish product evaluation plans and schedules.

Rationale: Nearly 140 products will be developed through the SHRP effort. Although only fifteen products are currently available for implementation, over 100 additional products should be available within SFY 93-94. The Department must establish formal roles, responsibilities, and schedules for their evaluation in order to ensure that all appropriate products are implemented.

APPENDIX 2 - ISSUES

1. Issues beyond the full control of the Division

   New Pavement Design Procedure Implementation

   Crumb Rubber Modified Asphalt, ISTEA Mandate

   Metrication

2. Bureau High and Low Priority Issues

   Engineering Research and Development Bureau

   Materials Bureau

   Soil Mechanics Bureau

New Pavement Design Procedure Implementation

The procedure has been completed by the Task Force. It uses a mechanistic/empirical design based on the 1986 AASHTO equation. Traffic forecasting and axle loading are important factors in the equation.

The Planning Division is revising their traffic forecasting procedure to include current and planned Weigh-In-Motion site data. This was the last unresolved Department comment on the Design procedure.

After discussion with the Program Management Bureau, a decision paper was written and presented to the Executive Committee. The decision paper included an Engineering Instruction to implement the new pavement design, the revised Design Procedure reflecting Main Office and Regional review comments, and costs benefit information. Additional costs analysis were requested and have been completed and distributed to the Executive Committee for policy concurrence. Concurrence is expected.

Crumb Rubber Modified Asphalt, ISTEA Mandate

ISTEA (Section 1038) requires that states use scrap tire rubber in asphalt pavement projects receiving federal funds beginning in 1994. The percentage of Crumb Rubber Modifier (CRM) starts at 5% and increases in 5% steps over the next three years to a maximum of 20%. This will have an impact in the hot asphalt mix industry and the Department's construction project funding. The overall costs to produce and apply rubber modified asphalt mixes can be 40-100% higher than that of standard asphalt mixtures. The long term performance and durability is unknown. The hot mix industry is against the mandate.

To meet the mandate, the Division has prepared a variety of specifications for both wet and dry processes, with experimental projects expected to be constructed during the 1993 construction season.

The Division is working with the Facilities Design and Construction Divisions on a proposal for consideration by executive management in implementing the mandate. The Division will continue to explore the issue and advise the Department of various compliance strategies.

Metric Conversion

The Department is obliged to convert to the metric system of measurement on all Federal Aided projects by September 30, 1996.

This conversion is mandated by an FHWA plan which resulted from a presidential order implementing the Omnibus Trade and Competitiveness Act of 1988.

Activities to date have included: Naming the Director of Technical Services Division as the Department Metric Coordinator, forming a Department Metric Steering Committee, developing and distributing a report entitled "NYSDOT Metric Conversion Impact Assessment", and development of a notification plan.

Activities to do include: Develop Department policy in conjunction with the Executive Committee to comply with the conversion mandate without jeopardizing Federal funding, form an implementation committee with Office and Region representatives, prepare notification and complete actions necessary to begin metrication.

The Metric Coordinator and staff will serve as a focus for metrication activities. Extensive effort and participation by all Offices and Regions is necessary to achieve implementation.

ENGINEERING RESEARCH AND DEVELOPMENT BUREAU ISSUES FOR SFY 93-94

High Priority

- Advancing the Contract Research Program.
- Assisting Structures Division in transferring Bridge Management System Technology to local highway departments.
- Provide consultation services to Department.
- Providing accelerated training and orientation for new staff.
- Provide technology transfer services to Department.

Low Priority

- Improvement of library services.
- Improving the engineering research computing platform.

MATERIALS BUREAU PROGRAM ISSUES - SFY 93-94

High Priority

- Develop specifications, guidelines and procedures for bridge painting abrasive blasting containment systems and alternate lead paint removal methods; and monitor performance of the lead paint removal operations

- Evaluate in-service performance of epoxy coated reinforcing steel bars in bridge decks

- Investigate the corrugated steel plate arch culvert failure due to corrosion on Route 481 in Onondaga County

- Implement the ISTEA crumb rubber modified asphalt concrete requirement

- Develop specification requirements for compaction of Rut Avoidance HMA mixes

- Install Strategic Highway Research Program asphalt binder test equipment

- Implement other SHRP products where/as appropriate

- Upgrade/retrofit 600K universal testing machine

- Develop applications for the Laboratory Information Management System

- Develop laboratory performance measures (Programmatic QA)

- Develop request for proposal (RFP) for next round (1994-1996) of inspection agency agreements

- Assist NYCDOT in the development of an FHWA approved materials quality assurance program

- Continue the SFY 92-93 3-year operational planning goal for hot mix asphalt and portland cement concrete quality control/quality assurance (QC/QA)

- Develop and complete two SFY 93-94 operational planning goals for programmatic quality assurance - Pavement Rehabilitation Treatment Selection Process and Regional Materials Laboratories

Low Priority

- Monitor the installation procedures for polyethylene drainage pipe installation on selected projects

- Monitor the paving operations for Rut Avoidance and Heavy Duty hot mix asphalt pavements

- Monitor new bridge deck construction and overlay construction practices

- Monitor in-place asphalt pavement recycling operations and performance of completed projects

- Acquire certification for selected environmental laboratory tests

- Implement programmatic rotation training program for new engineers

- Arrange for outside vendors to provide ACI Concrete Field Testing Technician, Grade 1, training and certification

SOIL MECHANICS BUREAU ISSUES FOR SFY 93-94

High Priority

- Follow through on getting the Region 1 Soils and Materials Laboratory facility completed and occupied.
- Train the new Regional Soils Engineers.
- Conduct the canal embankment study.
- Pilot direct data input from drill contracts into the DOT drill log database.
- Publish an updated "Procedure for the Control of Granular Materials" manual.
- Complete the Totally Automated Consolidation Test (TACT) upgrade.
- Evaluate the new triaxial/consolidation test equipment.
- Complete the IBM computer hook-up to as many Regional Soils Engineers as possible.
- Complete the rock slope re-evaluation process.
- Purchase and evaluate a falling weight deflectometer and plan future staffing and initial program applications.

Low Priority

- Improve the reporting processes for the rock slopes.
- Conduct corrosion awareness activities related to steel in the soil environment.
- Continue investigations into the potential corrosion of galvanized steel strips in MSES.
- Continue the evolution of Regional Soils Section performance measures.
- Continue evaluating Department input to the SPDES (State Pollution Discharge Elimination System) permit process.
- Continue to evaluate recycled materials for construction purposes.
- Evaluate the existing installed rock bolts in the inventory.
- Evaluate some AASHTO test procedures for possible future laboratory accreditation.
- Consider a contingent drill contract for one or more Regions.

APPENDIX 3 - PROPOSED BUDGET FOR SFY 1994-95

PROPOSED BUDGET FOR SFY 1994/1995

Base Budget for SFY 94/95

The Technical Services Division through the Soil Mechanics and Materials Bureaus supports the testing laboratories in each Region. Input from the Regions and experience in supply and equipment usage go into working up the Budget. Central Office Engineering support and testing costs in both Soils and Materials is also incorporated in the Budget. The Division also supports the Department's Engineering Research and Development Bureau and that programs input is also included.

In order to continue to support the capital program, we recommend continuing the base budget at SFY 93/94 funding levels with adjustments to the base made to account for new programs and changed conditions.

Initiatives to Base Budget for SFY 94/95

The following initiative is under consideration for SFY 94/95:

Establish engineering and laboratory services in the Materials Bureau dedicated to the technical issues that confront the Department's bridge painting program in the following areas:

- Lead paint removal technologies
- Containment technologies and alternatives
- Surface preparation methods and techniques
- Coating system technologies and alternatives
- Laboratory analysis of air quality filters, soil and water samples

Engineering services will be provided by establishing a unit responsible for implementation of the new Class A containment specifications. The unit will issue guidelines and assist regional staff in review of contractor submittals for the approval of the containment system to be employed. The unit will issue operational guidelines for inspection staff and will coordinate job site data collection and analysis in order to evaluate effectiveness of the containment system and document compliance with air quality standards.

The unit will coordinate the field evaluation of alternative technologies for the removal of existing lead based paint. Those that appear worthwhile will be used to supplement standard construction practice. The unit will track new surface preparation, painting, and containment system technologies through their research and development stages. The unit will develop expertise, provide technology transfer, and will be responsible for the development of new specifications based upon the latest information available.

The unit will be located in the General Engineering Section of the Materials Bureau, and staffing will consist of one Civil Engineer 2 (SG-24) as unit supervisor and four Civil Engineer 1's (SG-20). At least 2 of the CE1 positions shall be Junior Engineer progression titles.

Laboratory services will be provided by the acquisition of testing equipment to analyze air quality filters, soil and water samples on a timely basis. This equipment will enable NYSDOT to assess compliance with air quality and worker safety standards, to determine the nature and presence of hazardous waste at the job site or in generated debris, and to determine efficiency of containment system components used on NYSDOT contracts. It is expected that the additional workload will require the addition of one Engineering Materials Analyst (SG-14) and one Principal Engineering Technician (SG-16) assigned to the Chemical Laboratory. The Materials Bureau will seek environmental accreditation for this testing capability.

APPENDIX 4 - MATERIALS BUREAU

OPERATIONAL PLANNING

OPERATIONAL PLANNING - SFY 93-94

MATERIALS BUREAU PROGRAM
APRIL 8, 1993

Program Delivery

- Maintain program delivery as top priority
- Selectively modify QA procedures to maintain acceptable level of materials quality and provide accurate and timely acceptance actions
- Maximize utilization of allocated resources
- Provide essential training to Bureau and Regional materials program staff
- Provide QA on Regional materials program
- Provide materials engineering support to Regions and Main Office units
- Implement necessary new and revised materials specifications and procedures to meet program requirements

Program Initiatives

- Implement LIMS applications
- Assist NYCDOT in Materials QA program development
- Install SHRP asphalt binder test equipment
- Monitor bridge painting abrasive blasting containment systems and alternate lead paint removal methods
- Evaluate in-service performance of epoxy coated rebars in bridge decks
- Monitor polyethylene drainage pipe installation on selected projects
- Investigate steel plate arch culvert failure on Route 481 due to corrosion
- Monitor quality of pavement evaluations/treatment selections performed by Regional units
- Implement the ISTEA crumb rubber modified asphalt concrete requirement

- Monitor construction of Rut Avoidance and Heavy Duty hot mix asphalt pavements
- Evaluate pilot projects using HMA QC/QA specifications
- Evaluate experimental projects using PCC QC/QA specifications
- Monitor new bridge deck construction and overlay construction practices
- Acquire certification for selected environmental laboratory tests
- Implement programmatic rotation training program for new engineers
- Upgrade/retrofit 600K universal testing machine

Resource Management

- Develop RFP for next round (94-96) of inspection agency agreements
- Utilize temporary technicians
- Develop laboratory performance measures
- Develop reporting system for regional laboratory testing program
- Arrange for outside vendors to provide ACI Concrete Field Testing Technician, Grade 1, training and certification
- Develop plan for adequate number of vehicles, state or rental, to serve Bureau travel needs
- Manage NPS funds within allocations

Goal Ideas

- Asphalt & Concrete QC/QA (continuing)
- Upgrade/retrofit 600K universal testing machine
- Monitor quality of pavement evaluations/treatment selections performed by Regional units

SFY 92-93 Major Program Accomplishments

- Implemented 12 Inspection Agency agreements for period 7/1/92 - 6/30/94; included services to supplement Region laboratory testing and coring operations

- Managed materials program operations with NPS allocations
- Acquired LIMS, LAN, image analyzer system, atomic absorption spectrometer, reflectometer and upgraded/retrofitted pavement friction test system
- OGS completed fog room structural beam repair
- Designed and installed new magnesium sulphate solution tank for aggregate testing
- Published revised test methods for aggregates
- Published detailed calibration procedure manual for Lo-Cap test machine
- Acquired AASHTO Laboratory Certification for bituminous concrete and aggregates
- Completed field/laboratory tests on flexible delineators and tubular markers for the NASHTO Regional Test Program
- Installed and operated for one month an FHWA loaned set of SHRP asphalt binder test equipment
- Performed testing of water and soil samples for Waterways Division (permit recertification program)
- Developed Materials Bureau's presentation for the Department's programmatic training program
- Developed recertification program for ACI Concrete Field Testing Technician, Grade 1
- Hosted Northeast States' Materials Engineers Association meeting
- Improved format of the Department's Approved List for Materials and Equipment
- Conducted training classes on the Pavement Rehabilitation Manual - pavement evaluation, treatment selection and life cycle cost analysis
- Assisted NYCDOT in their development of materials quality assurance plans approved by the FHWA
- Developed/implemented revised specifications and QA procedures for corrugated polyethylene drainage pipe
- Developed/implemented revised high friction aggregate specifications that placed restrictions on the use of Wappinger Dolomite (Regions 8, 10 & 11)

- Investigated hot mix asphalt pavement performance problems due to high mica content in the aggregate

- Completed data analysis and report on corrosion of steel piles in the Buffalo Skyway

- Wrote a position paper on bridge painting abrasive blasting alternatives for removal of lead paint and developed the "Class A" abrasive blasting containment specification

- Developed and implemented Rut Avoidance and revised Heavy Duty hot mix asphalt specifications

- Developed guidelines for use of in-place pavement recycling treatments

- Completed experimental QC/QA hot mix asphalt projects

- Developed and implemented micro-surfacing specifications

- Assisted the Structures Division in the development of a micro-computer program for designing precast concrete box culverts

APPENDIX 5 - SOIL MECHANICS BUREAU

OPERATIONAL PLANNING

OPERATIONAL PLANNING - SFY 93-94

SOIL MECHANICS BUREAU PROGRAM
APRIL 8, 1993

Accomplishments 1992-1993

- New Regional Soils Engineers in Regions 1, 2 and 10.
- Lost parenthetics for Assistant and Senior Soils Engineers.
- New rock slope evaluation procedure implemented (35% complete)
- Pavement task force produced new design manual (Ray Gemme, Chairman).
- New triaxial/consolidation machine (received).
- AASHTO Accreditation for several soil tests (two laboratories).
- PPM - "What Does The Project Manager Need To Know About The Soils Program Area?"
- Prime the Pump rock projects ($7M) and a prefab edge drain contract.
- AASHTO standard for DPLT approved.
- Routine evaluation of liquefaction potential at bridge sites.
- TRB - Debra Harbuck's Lightweight Fill Material paper.
- Case Histories
  - Oak Point, Soil Nailed Wall
- Suffern - Major involvement in investigation.
- Route 481 - Major involvement in task force redesign and forensic engineering plan.
- Pavement and bridge coring - SMB responsible for equipment/supplies/training.
- DOT/AGC Annual Meeting - Wes Chaired materials of construction segment.
- CADD - Significant progress in production.
- IAST - GSL responsible for Soil items.
- SMRL - GSL Quality Assurance Program.

Predictions for 1993-94

- Retirees - Ed Fernau, Gerry Falconio, Clay Bolton, and Ross Sangster

- New Soils Engineer in Region 7 - Scott Docteur.

- HD&C - PAW - Rotation for management development.

- Subsurface Exploration Section - Provisional appointment soon.
  Exam in fall.

- Associate Engineering Geologist list - 2 year extension of Civil Service list.
  - Major problem for Soils and Materials Bureaus.

- Temporary Service - 6 Technician positions.

- Adequate Technician support for GSL - Loss of experienced personnel to Region 1.

- Earthwork Inspector's Schools - Offered to all Regions.

- Canal MOU
  - Embankment study.

- Falling Weight Deflectometer (FWD)

- New drill rigs will be delivered.

- Drill crew staffing.
  - Possible increased pattern
  - Drill laborer upgrade - Being pursued with Personnel Bureau.

- Drill Contracts - Several $1M contracts.

- Revised SCP - will incorporate recycled concrete/Manual updates.

- TACT upgrade completed.

- Corrosion - Skyway Report completed.

- New Region 1 Soil/Materials Lab

- Rock issues - Large volume of work in Region 8 and other Regions.

- I-890 Pavement Void.

- Training - Barbara O'Rourke.

- Region communications hookups - boring log.

APPENDIX 6 - ENGINEERING RESEARCH AND DEVELOPMENT BUREAU

OPERATIONAL PLANNING

OPERATIONAL PLANNING - SFY 93-94

ENGINEERING RESEARCH & DEVELOPMENT BUREAU PROGRAM
APRIL 8, 1993

Accomplishments 1992-1993

- Published 17 reports on various topics

- Developed a design methods for traffic signal poles

- Developed SHRP Implementation Plan

- Signed contract with Benet Lab for technical assistance

- Wes Yang was invited by the FHWA Pavement Division to serve on a technical review panel for a newly developed NHI training course, "AASHTO Design Procedures for New Pavements." Wes attended a meeting at the Turner/Fairbanks Research Center to review and rank the proposals submitted by the contractors.

- Gongkang Fu presented a paper entitled "Non-destructive Evaluation of Highway Bridges by Dynamic Monitoring" at a conference on Non-destructive Evaluation of Structures and Materials held in Boulder, Colorado May 11-13, 1992.

- During June, 1992 Wes Yang attended the annual AASHTO Joint Task Force on Pavement meeting. Highlights of the meeting included: revisions of the 1986 Design Guide, SHRP LTPP activities, FHWA research activities, NCHRP research update, Siler City Test Site visit, and Metrication. On his return, Wes made a presentation briefing Technical Services personnel and R. Lambert on the meeting.

- Gongkang Fu presented a paper entitled "First Order Importance Sampling Method and Its Variance Reduction" at the 9th ASCE Engineering Mechanics Conference held in College Station, Texas.

- Robert Perry, Wes Yang, Julian Bendaña, and Hong-Jer Chen provided assistance to the Materials Bureau on the Thruway Authority's Suffern Exchange Project. A sensitivity analysis was provided to estimate an equivalent ACC pavement thickness to 10" of PCC pavement. This was done to compare the life-cycle costs of both types.

- Julian Bendaña responded to a request by C. R. Fosdick for technical assistance computing pavement service lives using the Damage Factors for single units, five-axle semi-trailers, and seven-axle semi-trailers in New York State. This consultation is part of the Roadwork Concept Study.

- Gongkang Fu presented the following two papers at the ASCE Probablistic and Structural Reliability Conference held during July 8 and 10, 1992 in Denver, Colorado:

a: "Vibration Control of Highway Bridges under Earthquakes, and
b: "Structural Reliability and Proof Testing for Highway Bridges"

- Wes Yang attended the NCHRP 1-30 (Support Under PC Concrete Pavements) project panel meeting in Washington, DC to review the proposals and select the research agency.

- Sherif Boulos performed calculations to analyze the four-span Croton River Bridge and computed the maximum bending moment in each span due to a moving crane. He presented the results to the Structures Division's Construction Group.

- Gongkang Fu submitted a paper to TRB for the 1993 meeting entitled "Decomposed-Elements-Approach to Signal Pole Base Plate Design."

- Robert Perry, at the invitation of Charles Miller, met with other members of the FHWA Strategic Team in Washington, D.C. to develop the objectives and strategies for the national research and development goal. The only other outside members of the strategic team were Bob Reilly of TRB, and Dr. James Taylor of the University of Notre Dame.

- Julian Bendaña met with L. Groskopf from the Systems Program Planning Bureau to discuss damage factors for typical vehicles in New York. He provided technical assistance in computing Equivalent Single Axle Loads (ESALs) and Damage Factors for six-axle tractor semi-trailers with gross vehicle weights ranging from 60-140 kips. This is part of the ongoing "Roadwork -Phase2" consultation.

- Sherif Boulos analyzed the Patroon Island Bridge with modified retrofitting bracing and the results were submitted to the Structures Division. Two continuous spans were also analyzed for all possible failure mechanisms.

- Deniz Sandhu provided Structures with tie-rod sampling plan guidelines on the Woodhaven Bridge in New York City.

- Gongkang Fu assisted the Structures Design and Construction Division on the Queens Midtown Viaduct Rehabilitation Project in providing a method for lateral buckling checking.

- Julian Bendaña prepared three sections of the new NYSDOT pavement design procedures (Slab length design, dowel design, and tie-bar design).

<u>Emphasis Areas For 1993-94</u>

- SHRP implementation

- Contract Research implementation

- Greater T^2 effort

- Support for construction field office automation efforts